CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 92-104

AMENDING NPDES PERMITS FOR THE DISCHARGERS
CITED HEREIN

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

1. The dischargers listed below have been previously issued Waste Discharge Requirements by the Board under the National Pollutant Discharge Elimination System (NPDES) in the Orders indicated below:

Discharger	NPDES Number	Order Number	Date Adopted
GROUP A			
City of Palo Alto, Regional Water Quality Control Plant	CA0037834	88-175	21DEC88
Cities of San Jose and Santa Clara, San Jose/Santa Clara WPCP	CA0037842	89-012	18JAN89
City of Sunnyvale, Sunnyvale WPCP	CA0037621	88-176	21DEC88
Fairfield-Suisun Sewer District	CA0038024	90-101	18JUN90
GROUP B			
Central Contra Costa Sanitary District	CA0037648	89-170	15NOV89
City and County of San Francisco Southeast WPCP	CA0037664	89-101	21JUN89
GROUP C			
East Bay Dischargers Authority	CA0037869	89-098	21JUN89
East Bay Municipal Utility District Special District No. 1	CA0037702	89-149	20SEP89

2. The purpose of this Order is to add chronic toxicity effluent limitations to the NPDES permits of the dischargers cited in Finding 1. The limitations and provisions required in this Order are based on State plans and data generated by the Effluent Toxicity Characterization Program (ETCP). These are discussed in more detail in the findings below.

3. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986, and the State Water Resources Control Board (State Board) approved it on May 21, 1987. This Basin Plan initiated the Effluent Toxicity Characterization Program (ETCP) in which 25 dischargers (21 majors and 4 minors) were required to monitor their effluent using critical life stage toxicity

tests. The purpose of the ETCP is to generate information on toxicity test precision, test species sensitivity, and effluent variability to allow development of appropriate chronic toxicity effluent limitations.

4. On April 11, 1991, the State Board adopted the Water Quality Control Plan For Enclosed Bays and Estuaries of California (Enclosed Bays and Estuaries Plan). This plan establishes an ambient water quality objective outside discharge mixing zones of no chronic toxicity, expressed as an objective of 1 TUc (chronic toxicity unit).

5. The Enclosed Bays and Estuaries Plan specifies that a chronic toxicity effluent limitation is required in discharge permits for publicly-owned treatment works with a pretreatment program. The dischargers cited in Finding 1 are required by NPDES regulations to implement a pretreatment program, and therefore, are required to have chronic toxicity effluent limitations in their discharge permits.

6. The Board and EPA have classified the eight dischargers cited in Finding 1 as major dischargers. These dischargers participated in the ETCP and have completed the required tests. They are grouped into three general categories, Groups A, B and C, based on dilution credit and status with respect to investigating sources of toxicity.

7. The discharges of treatment plant effluent by the dischargers cited in Finding 1, Group A are classified as shallow water discharges. The chronic toxicity effluent limitation specified in this Order is based on zero dilution.

8. The discharges of treatment plant effluent by the dischargers cited in Finding 1, Groups B and C are classified as deep water discharges because each discharge is through an outfall with a diffuser. The chronic toxicity effluent limitation specified in this Order for these dischargers is based on a dilution ratio of 10:1.

9. The dischargers cited in Finding 1, Groups A and B, detected chronic toxicity in the treatment plant effluent during the course of the ETCP and are currently performing chronic toxicity identification evaluations (TIE) or have been required to do so by the Executive Officer pursuant to California Water Code §13267. This Order requires these dischargers to continue with their efforts.

10. The dischargers cited in Finding 1, Group C did not detect sufficient chronic toxicity during the ETCP to warrant a chronic TIE. These dischargers will be required to commence routine compliance monitoring upon adoption of this Order.

11. The amendment of waste discharge requirements for these discharges is exempt from the provisions of Chapter 3 (commencing with Section 21000 of Division 13) of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.

12. The Board has notified the dischargers and interested agencies and persons of its intent to amend waste discharge requirements, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

13. The Board, in a public meeting, heard and considered all comments pertaining to the amendment of waste discharge requirements for the above discharges.

IT IS HEREBY ORDERED that:

A. The NPDES Permits contained in the Orders cited in Finding 1, Group A shall be amended to include the following effluent limitation:

There shall be no chronic toxicity in the effluent from the treatment plant as discharged, above the levels defined by:

a. an eleven sample median value[1] of 1 TUc[2]; or

b. a 90 percentile value[3] of 2 TUc[2].

[1] If five or more of the past ten or less samples show toxicity greater than 1 TUc, then a test sample showing chronic toxicity greater than 1 TUc represents consistent toxicity and a violation of this limitation.

[2] A TUc equals 100/NOEL. The NOEL is the no observable effect level, determined from IC, EC, or NOEC values. These terms and their usage in determining compliance with the limitations are defined in Attachment A of this Order. The NOEL shall be based on a critical life stage test using the most sensitive test species as specified by the Executive Officer. The Executive Officer may specify two compliance species if test data indicate that there is alternating sensitivity between the two species. If two compliance test species are specified, compliance shall be based on the maximum TUc value for that discharge sample based on a comparison of TUc values obtained through concurrent testing of the two species.

[3] A test sample showing chronic toxicity greater than 2 TUc represents consistent toxicity and a violation of this limitation if one or more of the past ten or less samples shows toxicity greater than 2 TUc.

B. The NPDES Permits contained in the Orders cited in Finding 1, Groups B and C shall be amended to include the following effluent limitation:

There shall be no chronic toxicity in the effluent from the treatment plant as discharged, above the levels defined by:

a. an eleven sample median value[1] of 10 TUc[2]; or

b. a 90 percentile value[3] of 20 TUc[2].

[1] If five or more of the past ten or less samples show toxicity greater than 10 TUc, then a test sample showing chronic toxicity greater than 10 TUc represents consistent toxicity and a violation of this limitation.

[2] A TUc equals 100/NOEL. The NOEL is the no observable effect level, determined from IC, EC, or NOEC values. These terms and their usage in determining compliance with the limitations are defined in Attachment A of this Order. The NOEL shall be based on a critical life stage test using the most sensitive test species as specified by the Executive Officer. The Executive Officer may specify two compliance species if test data indicate that there is alternating sensitivity between the two species. If two compliance test species are specified, compliance shall be based on the maximum TUc value for that discharge sample based on a comparison of TUc values obtained through concurrent testing of the two species.

[3] A test sample showing chronic toxicity greater than 20 TUc represents consistent toxicity and a violation of this limitation if one or more of the past ten or less samples shows toxicity greater than 20 TUc.

C. The NPDES Permits contained in all the Orders cited in Finding 1 shall be amended to include the following provision:

Pursuant to 40 CFR 122.44, 122.62, and 124.5, the definition of the NOEL contained in Attachment A of this Order may be modified prior to the expiration date based on guidance issued by the State Board.

D. The NPDES Permits contained in all the Orders cited in Finding 1 shall be amended to include the following provision:

If there is a violation of the chronic toxicity effluent limitation, the discharger shall conduct a chronic toxicity reduction evaluation (TRE), which shall initially involve a toxicity identification evaluation (TIE). The TIE shall be in accordance with a work plan acceptable to the Executive Officer. The TIE shall be initiated within 30 days of the date of violation. The objective of the TIE shall be to identify the chemical or combination of chemicals that are causing the observed toxicity. Every effort using currently available TIE methodologies shall be employed by the discharger. As toxic constituents are identified or characterized, the discharger shall continue the TRE by determining the source(s) of the toxic constituent(s) and evaluating alternative strategies for reducing or eliminating the constituent(s) from the discharge. All reasonable steps shall be taken to reduce toxicity to the required level. The Board recognizes that identification of causes of chronic toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based in part on the discharger's actions in identifying and reducing sources of consistent toxicity.

E. The NPDES Permits contained in all the Orders cited in Finding 1 shall be amended to include the following provision:

The discharger shall conduct screening phase compliance monitoring in accordance with a proposal submitted to and acceptable to the Executive Officer. The proposal shall contain, at a minimum, the elements specified in Attachment B of this Order. The purpose of the screening is to determine the most sensitive test species for subsequent routine compliance monitoring for chronic toxicity. Screening phase compliance monitoring shall be conducted under either of these two conditions:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts; or

2. Prior to Permit reissuance, except when the discharger is conducting a TIE and/or TRE. Screening phase monitoring data shall be included in the NPDES Permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

F. The NPDES Permits contained in the Orders cited in Finding 1, Group C shall be amended to include the following provision:

The discharger shall comply with the following:

1. Commence monitoring within three months of the date of adoption of this Order, in accordance with the attached Self-Monitoring Program modifications as adopted by the Board. The Self-Monitoring Program may be amended by the Board pursuant to EPA regulations 40CFR122.62, 122.63, and 124.5.

2. Submit a general TIE work plan acceptable to the Executive Officer three months after the date of adoption of this Order. If violation of the chronic toxicity effluent limitation occurs, the discharger shall implement the TIE work plan within 30 days of the date of violation.

G. The NPDES Permits contained in the Orders cited in Finding 1, Groups A and B shall be amended to include the following provision:

The discharger shall continue diligently with toxicity identification evaluation (TIE) efforts on the treatment plant effluent in accordance with work plans acceptable to the Executive Officer, and shall pursue toxicity reduction evaluations (TRE) as appropriate. TIE/TRE efforts shall continue until the discharger demonstrates that the discharge complies with the chronic toxicity effluent limitation. The Board recognizes that identification of causes of chronic toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based in part on the discharger's diligence in identifying and reducing sources of persistent toxicity.

H. This Order shall serve as modification of National Pollutant Discharge Elimination System permits pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall become effective on the date of adoption provided the Regional Administrator, Environmental Protection Agency, has no objection. If the Regional Administrator objects to its issuance, the modifications shall not become effective until such objection is withdrawn.

I, Steven R. Ritchie, Executive Officer do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on August 19, 1992.

STEVEN R. RITCHIE
Executive Officer

Attachments:

Attachment A - Definition of NOEL
Attachment B - Screening Phase Monitoring Requirements
Amendments to Self-Monitoring Programs

ATTACHMENT A

DEFINITION OF NO OBSERVED EFFECT LEVEL

No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, "all or nothing," response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25% of the test organisms.

Inhibition Concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal, non-quantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25% reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as EPA's Bootstrap Procedure.

No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

ATTACHMENT B

SCREENING PHASE MONITORING REQUIREMENTS

A. Screening phase compliance monitoring is required:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts; or

2. Prior to Permit reissuance. Screening phase monitoring data shall be included in the NPDES Permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

B. Design of the screening phase shall, at a minimum, consist of the following elements:

- Use of test species specified in Table B-1 and B-2 (attached), and use of the protocols referenced in those tables, or as approved by the Executive Officer;

- Two stages:

  Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on Table B-3 (attached); and

  Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

- Appropriate controls; and

- Concurrent reference toxicant tests.

C. The discharger shall submit a screening phase proposal to the Executive Officer for approval. The proposal shall address each of the elements listed above.

TABLE B-1
CRITICAL LIFE STAGE TOXICITY TESTS FOR ESTUARINE WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
alga (Skeletonema costatum) (Thalassiosira pseudonana)	growth rate	4 days	1
red alga (Champia parvula)	number of cystocarps	7-9 days	5
giant kelp (Macrocystis pyrifera)	percent germination; germ tube length	48 hours	3
abalone (Haliotis rufescens)	abnormal shell development	48 hours	3
oyster (Crassostrea gigas) mussel (Mytilus edulis)	abnormal shell development; percent survival	48 hours	2
Echinoderms (urchins - Strongylocentrotus purpuratus, S. franciscanus); (sand dollar - Dendraster excentricus)	percent fertilization	1 hour	4
shrimp (Mysidopsis bahia)	percent survival; growth; fecundity	7 days	5
silversides (Menidia beryllina)	larval growth rate; percent survival	7 days	5

TOXICITY TEST REFERENCES

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for conducting static 96-hour toxicity tests with microalgae. Procedure E 1218-90. ASTM, Philadelphia, PA.

2. American Society for Testing Materials (ASTM). 1989. Standard Practice for conducting static acute toxicity tests with larvae of four species of bivalve molluscs. Procedure E 724-89. ASTM, Philadelphia, PA.

3. Anderson, B.B. J.W. Hunt, S.L. Turpen, A.R. Coulon, M. Martin, D.L. McKeown, and F.H. Palmer. 1990. Procedures manual for conducting toxicity tests developed by the marine bioassay project. California State Water Resources Control Board, Sacramento.

4. Dinnel, P.J., J. Link, and Q. Stober. 1987. Improved methodology for sea urchin sperm cell bioassay for marine waters. Archives of Environmental Contamination and Toxicology 16:23-32. and S.L. Anderson. September 1, 1989. Technical Memorandum. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

5. Weber, C.I., W.B. Horning, II, D.J. Klem, T.W. Neiheisel, P.A. Lewis, E.L. Robinson, J. Menkedick, and F. Kessler (eds.). 1988. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to marine and estuarine organisms. EPA-600/4-87/028. National Technical Information Service, Springfield, VA.

TABLE B-2
CRITICAL LIFE STAGE TOXICITY TESTS FOR FRESH WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
fathead minnow (Pimephales promelas)	survival; growth rate	7 days	6
water flea (Ceriodaphnia dubia)	survival; number of young	7 days	6
alga (Selenastrum capricornutum)	cell division rate	4 days	6

TOXICITY TEST REFERENCE

6. Horning, W.B. and C.I. Weber (eds.). 1989. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Second edition. U.S. EPA Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. EPA/600/4-89/001.

TABLE B-3
TOXICITY TEST REQUIREMENTS FOR STAGE ONE SCREENING PHASE

REQUIREMENTS	RECEIVING WATER CHARACTERISTICS		
	DISCHARGES TO COAST	DISCHARGES TO SAN FRANCISCO BAY‡	
	Ocean	Marine	Freshwater
Taxonomic Diversity	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish
Number of tests of each salinity type			
Freshwater†	0	1 or 2	3
Marine	4	3 or 4	0
Total number of tests	4	5	3

† The fresh water species may be substituted with marine species if:

1) the salinity of the effluent is above 5 parts per thousand (ppt) greater than 75% of the time, or

2) the ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.

‡ Marine refers to receiving water salinities greater than 5 ppt at least 75% of the time during a normal water year. Fresh refers to receiving water with salinities less than 5 ppt at least 75% of the time during a normal water year.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

CHRONIC TOXICITY MONITORING REQUIREMENTS

MODIFICATIONS TO SELF-MONITORING PROGRAMS

AS REQUIRED BY

ORDER NO. 92-104
ADOPTED August 19, 1992

FOR

Discharger	NPDES Number	Order Number	Date Adopted
East Bay Dischargers Authority	CA0037869	89-098	21JUN89
East Bay Municipal Utility District Special District No. 1	CA0037702	89-149	20SEP89

I. CHRONIC TOXICITY MONITORING REQUIREMENT

A. Test Species and Frequency: The discharger shall collect 24-hour composite sample of the treatment plant effluent at the compliance point station specified in the Self-Monitoring Program, for critical life stage toxicity testing in accordance with the attached table. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

B. Methodology: Sample collection, handling and preservation shall be in accordance with EPA protocols. The test methodology used shall be in accordance with the references cited in Order No. 92-104, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

C. Dilution Series: Shallow water dischargers (those cited in Finding 1 Group A of Order No. 92-104) shall conduct tests at 100%, 75%, 50%, 25%, and 12.5%. Deep water dischargers (those cited in Finding 1 Groups B and C of Order No. 92-104) shall conduct tests at 50%, 25%, 10%, 5%, and 2.5%. The "%" represents percent effluent as discharged.

II. CHRONIC TOXICITY REPORTING REQUIREMENTS

A. Routine Reporting: Toxicity test results for the current reporting period shall include at a minimum, for each test

1. sample date(s)
2. test initiation date
3. test species
4. end point values for each dilution (e.g. number of young, growth rate, percent survival)
5. NOEC value(s) in percent effluent
6. IC_{10}, IC_{15}, IC_{25}, and IC_{50} values (or EC_{10}, EC_{15} ... etc.) in percent effluent
7. TUc values (100/NOEC, 100/IC_{25}, and 100/EC_{25})
8. Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)
9. NOEC and LOEC values for reference toxicant test(s)
10. IC_{50} or EC_{50} value(s) for reference toxicant test(s)
11. Available water quality measurements for each test (e.g. pH, D.O, temperature, conductivity, hardness, salinity, ammonia)

B. Compliance Summary: Each self-monitoring report shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include the items listed above under Section A item numbers 1, 3, 5, 6(IC_{25} or EC_{25}), 7, and 8.

C. Reporting Raw Data in Electronic Format: On a quarterly basis, by February 15, May 15, August 15, and December 15 of each year, the discharger shall report all chronic toxicity data for the previous calendar quarter in the format specified by the Statewide Chronic Toxicity Database Management System.

TEST SPECIES AND FREQUENCY
CHRONIC TOXICITY MONITORING REQUIREMENTS

DISCHARGER	TEST SPECIES[1/]	FREQUENCY[1/]
East Bay Dischargers Authority	*Ceriodaphnia dubia*	M
East Bay M.U.D., Sp. Dist. 1	Echinoderms[2/]	M

NOTES

M = Once each month

1/ After at least twelve test rounds, the discharger may request the Executive Officer to decrease the required frequency of testing, and/or to reduce the number of compliance species to one. Such a request may be made only if toxicity exceeding the TUc values specified in the effluent limitations was never observed using that test species.

2/ The discharger shall make a reasonable effort to obtain spawning organisms for echinoderm and mollusc tests. This effort should, at a minimum, consist of ordering 50 (oysters and urchins) or 100 (mussels) specimens from two suppliers. Documentation should consist of order forms or verification of order placed by telephone (signed and dated entries in a bound book).